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Poverty-reducing or Poverty-inducing? A CGE-based Analysis of Foreign Capital Inflows in Pakistan

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ABSTRACT

Foreign capital inflows (FKI) help an economy by financing the imbalance between income and expenditure. However, their impact on poverty in the recipient economy is a controversial issue. In this study, we examine the impact on poverty in two different scenarios: (1) labour is homogeneous; (2) labour is heterogeneous. The Computable General Equilibrium model for Pakistan is used to conduct simulations in order to assess the impact of an increase in foreign capital on poverty both in the presence and in the absence of trade liberalisation. Several interesting results emerge from the study. First, FKI tends to reduce poverty in the presence as well as in the absence of trade liberalisation when labour is homogeneous. However, poverty reduction appears to be larger in the presence of trade liberalisation. Second, when labour is differentiated according to qualification and is assumed to be sector-specific, in the absence of trade liberalisation a higher proportion of benefits of FKI accrue to skilled labour and poverty increases by all measures for both urban and rural households. In the presence of trade liberalisation, FKI benefits unskilled labour more, and poverty is decreased irrespective of the choice of poverty indicators.

I. INTRODUCTION

Pakistan is a capital-scarce country and has been relying on foreign capital inflows (FKI) to finance the saving-investment gap. With a view to constraining the imports to the available foreign exchange, country has relied on import restrictions including licensing, quota and tariffs. These interventions created distortions resulting in the inefficient use of resources, by encouraging import substitution even in those sectors where the country does not have comparative advantage. The export sectors, where the country has a comparative advantage, and employ the most abundant factor of the economy, labour, has been neglected. The inefficient use of resources inflow has aggravated the poverty problem of the country. The main objective of this study is to analyse the impact of foreign capital inflow on poverty in the absence and presence of trade liberalisation.

FKI can contribute towards poverty reduction either directly or indirectly. Directly, when it is given to the poor and indirectly through the trickle-down effects from income-generating activities [Carvalho and White (1996)]. This paper focuses on the indirect channels and the investigations into the poverty implication of foreign capital inflow in presence and absence of trade liberalisation have been analysed into two different scenarios: First, we assume that labour is homogenous. In this framework, we trace the impact on poverty through the changes in factor rewards: wage, returns to capital, and prices. Second, exploring further the sources of income inequality we drop the assumption of homogeneity and assume different types of labour employed in different sectors. In this experiment, the impact of FKI on returns to different type of labour is analysed.

The study uses a comprehensive computable general equilibrium model for Pakistan[1] taking into account all sectors of the economy. In this paper we define capital movement in equilibrium as to be the excess of investment over domestic savings equal in magnitude to foreign savings and is reflected in the current account balance (CAB) [Baldwin (1971) and Oniki and Uzawa (1995)].

The organisation of the study is as follows. The next section reviews the growth performance of the economy, different forms of foreign capital inflow, structure of trade, employment, wages, and poverty. The review of literature is given in the third section. The analytical framework is discussed in section four. The main characteristics of the model and data are presented in section five. The simulation results are presented in section six. The final section concludes the paper.

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[1]Model developed for Trade Policy Analysis for the project 'Micro Impact of Macro Adjustment Policies on Poverty in Pakistan'. For details, see Siddiqui and Iqbal (1999), Siddiqui, *et al*. (1999) and Siddiqui, *et al*. (2006).

II. REVIEW OF ECONOMY

(a) Growth Performance

Pakistan's growth performance has deteriorated over time. The growth rate of GDP has declined gradually from 6.7 percent per annum during 1981-85 to 4.1 percent per annum during 1996-00. Only agricultural growth rate has accelerated from 3.8 percent to 4.6 percent over the same period. It has been the sharp fall in the growth rates of manufacturing and services sectors, which contributed to the deterioration process in the 1990s. The growth momentum of manufacturing reduced to less than one-half of what was achieved in the1980s; i.e., slowed down from 9.5 percent per annum in the first half of the 1980s to 3.9 percent in the second half of the 1990s. The services sector shows a decline over time of 3 percentage points. GNP growth declined more than GDP growth rate, 7.9 percent in 1981-85 to 4.1 percent in 1996-00. This may be due to the decline in remittances from abroad (see Table 1). Besides the slow down may be attributed to global economic slow down, low rate of human capital formation, rising debt and adverse political conditions.

Table 1

Growth Rates of GNP, GDP and Its Components (Percentage per Annum)

	1981–85	1986–90	1991–95	1996–00
Commodity Producing Sectors	7.16	5.86	5.03	4.17
Agriculture	3.78	4.37	4.19	4.63
Manufacturing	9.48	6.95	5.75	3.94
Services	7.91	5.34	5.12	4.08
GDP	6.69	5.60	5.06	4.12
GNP	6.58	4.64	4.39	3.68

Source: Economic Survey [Pakistan (Various Issues)].

Investment is essential for sustaining higher economic growth, and besides availability of capital goods (imported machinery) from the producers for investment; invest able resources play a crucial role. In the absence of foreign capital, domestic savings must rise. In Pakistan, unfortunately, both domestic saving and investment registered a decline in the 1990s. The national saving rate witnessed a decline from 14.1 percent in the first half of the 1980s to 12.7 percent in the second half of the 1990s (see Table 2). Foreign saving as a percentage of GDP has increased to 4.4 percent during 1996-00 as against 3.6 percent during 1981-85. As far as the financing of investment is concerned, reliance on external assistance has increased. During 1981-85, 82 percent of investment expenditure was financed through domestic saving and 18 percent from external savings. During 1996-2000, investment financing through foreign savings increased to 20 percent.

Table 2

Sources of Financing Investment (Percentage of GDP)

Years	National Saving	Foreign Saving	Fiscal Deficit	Trade Balance	Current Account Balance
1981-85	14.08	3.64	6.28	10.71	3.81
1986-90	14.01	3.80	7.74	7.15	4.00
1991-95	14.94	4.56	7.12	4.87	4.50
1996-00	12.67	4.42	6.66	3.94	4.50*

Source: Economic Survey [Pakistan (Various Issues)].

Note: *Though in recent years, it has decline but average during the period is 4.5 percent.

The decline in the overall investment rate in the 1990s owes much to the decline in public sector investment mainly due to the privatisation programme. The public investment ratio during fifteen years (1980-81 to 1994-95) remained constant around 8 percent, thereafter declined to 6.3 percent in 2000-01 (see Table 3). A further disaggregation of investment shows that private investment as a percentage of GDP registered an increase in the 1990s as compared to the 1980s. Fixed investment averaged 15.4 percent of GDP in the first half of the 1980s, declined to 14.3 percent in 2001. As a result, total investment declined from 17.2 percent in the first half of the 1980s to 15.9 percent in 2000-1. Besides low saving and investment can be attributed to many internal and external factors including the Gulf crisis (affecting household saving) and political instability etc.

Table 3

Investment as Percentage of GDP

Years	Fixed Investment	Public Investment	Private Investment	Total Investment
1981-85	15.42	8.55	6.87	17.15
1986-90	16.25	8.56	7.69	17.81
1991-95	17.97	8.56	9.31	19.31
1996-00	15.26	6.46	8.86	17.08
2000-01	14.30	6.30	8.00	15.90

Source: Economic Survey [Pakistan (Various Issues)].

The share of public investment and general government investment have declined, respectively, from 34.6 percent and 20.1 percent in total investment in 1981 to 23 percent and 15.5 percent in 2002. At the same time, share of private investment has increased from 45.2 percent in 1981 to 61.5 percent in 2002 (see Table 4).

Table 4

Structure of Investment (Percentage of Total Investment)

Years	Private Investment	Public Investment	General Government	Total	Foreign Investment*	Foreign Investment as Percentage of Private Investment
1981	45.29	34.65	20.06	100	2.23	4.93
1985	45.99	33.16	20.85	100	2.54	5.53
1990	51.71	28.75	19.54	100	3.09	6.03
1995	51.21	30.38	18.42	100	14.87	29.05
2000	58.52	27.18	14.30	100	6.22	10.63
2001-2	61.52	22.97	15.51	100	3.83	6.23

Source: Economic Survey [Pakistan (Various Issues)]
Note: *Foreign investment is taken from World Bank (2001).

Despite the decline in public investment, the fiscal deficit remained around 7 percent [Pakistan (Various Issues)]. The government continues to borrow to finance expenditure and thus reduces the availability of domestic funds for private investment. The trade deficit and current account balance (CAB) has declined but still around 4 percent during 1996-2000 (see Table 2). These imbalances, especially the persistent large fiscal deficit, raise concerns about the potential adverse effects on the growth performance. To achieve sustainable growth, Pakistan needs to increase total investment to 23-24 percent of GDP [Khan (1997)] instead of the current 15.9 percent of GDP. Since the desired investment levels are much higher than the current level of savings, country is in dire need of additional resources (foreign capital) to fill the gap between actual and desired investment if savings remain at the current level.

(b) Different Forms of Foreign Capital Inflows in Pakistan

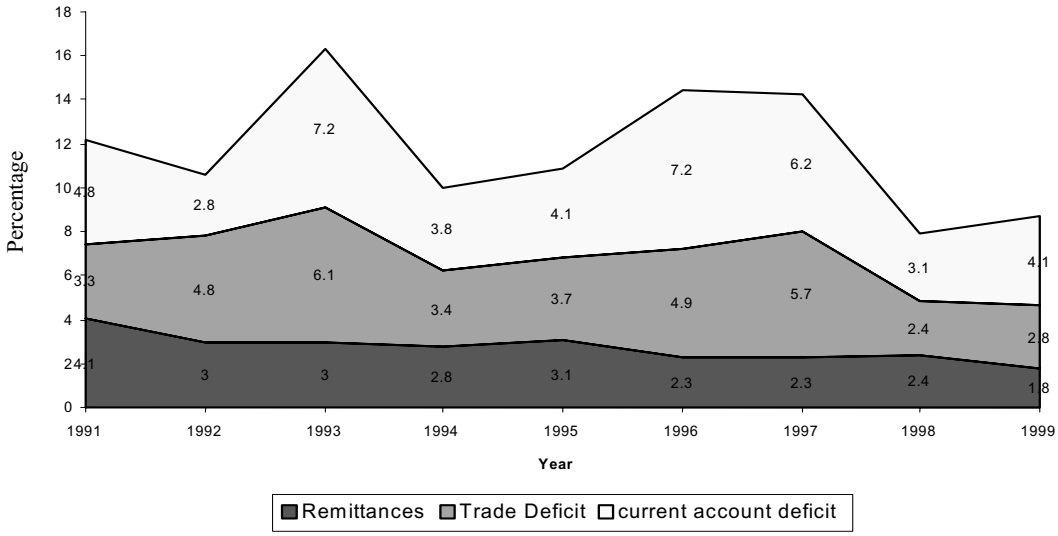
Over the years there has been a significant increase in foreign capital inflows, in terms of aid, both in the form of grants and concessional loans as an instrument for supplementing savings. However, with the passage of time this inflow changed the form from a larger share of grants to a larger share of loans resulting in a large debt burden and hard conditionalities from donors.[2] The country opted for policies aimed at attracting foreign capital inflow in terms of foreign direct investment and portfolio investment.

During 1981-95, the share of foreign direct investment in total investment and in private investment has increased from 2.2 percent and 4.9 percent to 14.87 percent and 29.3 percent, respectively, a rising dependence of the country on foreign capital inflows. However, due to various factors including sanctions, inconsistency of economic policies, foreign private investment has fallen. The event of September 11 greatly affected the

[2]The repayment period, which during the 60's was 30 years with grace period of 7 years, reduced to 22 years with a grace period of 6 years. Debt burden has increased due to decline in element of grants in foreign assistance. Grants and Grants like assistance have declined from 80 percent of total aid in the first Plan to 20 percent in non-planned period and again it reduced to less than 10 percent in the Eighth Plan period [Siddiqui (1997)].

investment climate, and has resulted in a decline in both ratios to 3.8 percent and 6.2 percent, respectively in 2002. But foreign saving remains positive through the period, which is evident from Figure 1. It shows different components of the balance of payments, remittances, trade deficit, and current account balance. They have declined over time but remains positive, filling the gap between income and expenditure.

Fig. 1. Different Components of Balance of Payments.



(c) Trade

Until 1981, Pakistan depended heavily on import bans and other restrictions to protect the domestic industry. About 41 percent of industrial value added was protected by import bans and another 22 percent by various other forms of import restrictions [Kemal (1994)]. Pakistan adopted trade liberalisation policies in 1981 by first reducing quantitative restrictions. A number of items were removed from the negative list. Items subject to different kinds of restrictions; licensing, value limit, and specificity of importer, were reduced [Kemal (1994)]. In the nineties, the Government of Pakistan focussed on rationalisation of the tariff structure and reduced the import duty rates as well as the number of duty slabs. At present, the maximum import duty is 25 percent except for automobiles and alcoholic drinks where tariff rate are still very high. On average the tariff rate has declined by 55 percent during the nineties [Siddiqui and Kemal (2002)]. However, despite tariff rationalisation and import liberalisation, the structure of imports do not show major changes. The share of imports as a percentage of GDP has declined from 24 percent during 1981-85 to 17.8 percent in 2000.[3] However, the shares of raw material for capital goods and raw material for consumer goods have declined from 6.8 percent and 48.2 percent to 5.6 percent and 46.8 percent, respectively. Imports of final

[3]Imports as a percentage of GDP may have declined as a result of devaluation, and the slow economic activity, especially the manufacturing activity.

consumer goods as a proportion of total imports increased from 14.6 percent to 15.4 percent over the whole period (see Table 5). Imports of capital goods as a percentage of total imports, show an increasing trend during 1981-1995, but decline thereafter. This is an indication of a slowdown in economic activity. On the other hand, effective demand management policies to restore macro-economic stability have compressed import demand.

Table 5

Share of Import by Economic Classification (Percentages)

Years	Capital Goods	Raw Material for		Consumer Goods	Total Imports in GDP
		Capital Goods	Consumer Goods		
1981-85	30.6	6.8	48.2	14.6	24.4
1986-90	36.0	6.6	40.4	17.0	20.9
1991-95	38.0	6.2	41.8	14.0	19.7
1996-00	32.2	5.6	46.8	15.4	17.8

Source: Economic Survey [Pakistan (Various Issues)].

However, exports as a percentage of GDP has increased from 13.6 percent to 15.3 percent during 1981 to 2001. The economic classification of exports shows that larger export earnings from the exports of manufactured goods particularly the textile products. Their share during 1981-85 averaged 53 percent increased to 72 percent in 2000-1. The share of exports of primary goods in total exports reduced to 13 percent in 2001 compared to 33.4 percent during 1981-85. The share of semi-manufactured exports fluctuated between 13.6 percent to 23 percent (see Table 6).

Table 6

Structure of Exports (Percentages)

Years	Exports of			Total	Exports/ GDP
	Primary	Semi-manufactured	Manufactured		
1981-85	33.4	13.6	53.0	100	13.6
1986-90	28.4	20.0	51.6	100	15.7
1991-95	14.8	23.0	62.2	100	20.0
1996-00	12.8	18.6	68.6	100	13.2
2000-01	13.0	15.0	72.0	100	15.3

Source: Economic Survey [Pakistan (Various Issues)].

(d) Employment

Growth, investment and poverty are closely linked with employment in the country. Changes in the growth pattern and mechanisation have brought about changes in the sectoral employment shares, though the share of agriculture is still the largest. It declined from 52.7 percent to 47.25 percent during the last two decades of the twentieth century (see Table 7). Among the non-agriculture sectors, the share of employed persons in mining and manufacturing has declined from 14.1 percent to 10.2 percent. Construction, transport, trade and others sectors show increasing employment shares. The unemployment has increased from 3.7 percent in 1981 to 7.8 percent in 2000. Recently it has increased to 6.9 percent.

Table 7

Distribution of Employed Persons by Economic Sectors (Percentages)

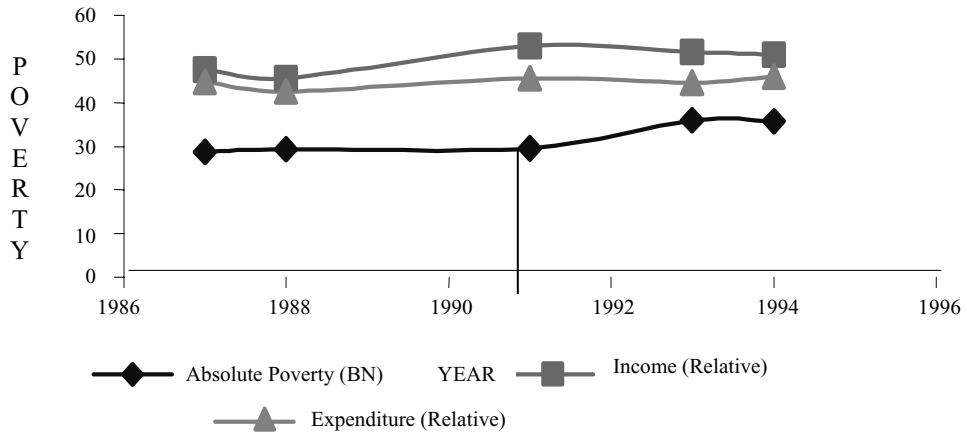
Years	Agri-culture	Mining and Manufacturing	Construction	Electricity and Gas	Trans-port	Trade	Others	Unemployment Rate Per Annum
1980-81	52.69	14.09	4.86	0.91	4.66	11.5	11.28	3.72
1985-86	54.01	13.40	5.24	0.52	4.42	11.40	11.01	3.66
1990-91	47.45	12.38	6.62	0.83	5.24	13.24	15.22	6.28
1995-96	46.79	10.50	7.21	0.82	5.07	14.50	15.12	5.37
1999-00	47.25	10.15	6.26	0.70	5.48	13.87	16.28	6.12
2001-02	48.42	11.55	5.78	0.70	5.03	13.50	15.02	6.90

Source: Economic Survey, GOPb (Various issues).

(e) Poverty in Pakistan

The evidence shows that incidence and intensity of absolute poverty as well as relative poverty has increased irrespective of the poverty lines [see Siddiqui and Kemal (2006)]. Figure 2 clearly shows that poverty, absolute as well as relative (based on distribution of income), was lower before 1988 and has increased in the latter period.

Fig. 2. Poverty Trend (Headcount).



The foreign capital inflows add to productive capacity,[4] but its impact on poverty is uncertain. The present study is an attempt to assess the impact of foreign capital inflow on poverty in Pakistan.

III. REVIEW OF LITERATURE

This section reviews the studies evaluating the impact of different forms of foreign capital inflow on macro aggregates and on poverty. White (1992), Carvalho and White (1996), and Siddiqui (1997) examine the impact of inflows in terms of aid or FDI on poverty directly. Other studies analyse the impact of foreign capital on growth. (Annex 1).

Discussing the impact of FKI on poverty, It is said that FKI may contribute toward poverty reduction either directly, when it is given to the poor and indirectly through trickle-down effects of income-generating activities [White (1996)]. In another study he argued that aid dies not effect to the poor because official aid does not go to the poor people directly. It goes to their rulers who formulate the spending policies by their own personal and political interest, among which the position of the poor has very low priority. The evidence provided by Siddiqui (1997) suggests that multinational companies (MNC's) are biased towards the adoption of technologies that were highly capital-intensive and raw material intensive and employ skilled labour. Hence, the potential for employment generation especially for unskilled labour is limited. She found that MNCs increase the wage gap and promote poverty. Gwin (2002) by reviewing the performance of International Development Assistance in developing countries, finds that during the period of persistence poverty, increasing inequality, and conflict, a number of borrowers, with IDA's help, show a decline in the incidence of poverty and strengthen the social development. The study concludes that even though IDA provides a small share of the resources that countries use to pursue their development priorities, it has made a major contribution to improve poverty and social development of structural adjustment operations.

Contrary to the expectation that globalisation would narrow the differential in the wage rate of skilled and unskilled workers, Wood (1995, 1998) finds that wage gap increased in developed countries with the expansion of trade with developing countries. Wood (1998) supports the view that globalisation is important contributory factor to deteriorating position of unskilled labour in developed countries.

The relationship between growth and FKI varies depending on the countries and variables included in the studies. For example, Shabbir and Mahmood (1992) estimating a two-equation model of the rate of real economic growth and saving ratio found that net foreign private investment, disbursements of grants and external loans have a positive impact on the rate of growth of real GNP in Pakistan. Michely demonstrates the impact of aid flows on the production and consumption of tradable versus non-tradable goods using the standard trade theory of general equilibrium and found that unilateral transfers of traded goods increase the production of non-traded goods and reduce that of traded

[4]The last few decades have seen an important role of foreign capital inflows in terms of foreign investments and international trade in economic growth of the East Asian economies and China.

goods. But its impact on consumption is not very clear. Numerical simulations by Abrego (1999) show that partial trade liberalisation in the presence of taxation on free mobility of capital reduces gains. Removal of tariffs leads to an outflow of capital and a loss of tax revenue. Vos (1993), analysing the impact of different forms of foreign capital in CGE framework found that foreign assistance would generate 'Dutch Disease' effects and would not support the export sectors and traded goods production though the loans from banks do support the traded goods production. Buffie (1985) found that direct foreign investment (DFI) is immiserising in a small tariff-distorted economy where capital is mobile and exports are labour-intensive. The same results are found when capital and land are specific factors of export and import respectively and capital is endogenously determined. In light of Buffie's argument, DFI's have a welfare worsening impact in presence of restricted imports and exports labour-intensive.

From the previous discussion, we may conclude that foreign capital inflow has country-specific impacts. All studies reviewed show a positive relationship between growth and FKI (which is defined differently in different studies) as long as there are no serious distortions in the system. Therefore, if growth is a pre-requisite for poverty reduction, then we may conclude that FKI inflows would help in reducing poverty. However, these studies do not take into account all sectors of the economy and ignore many inter-linkages of the economy and therefore the results of these studies may be biased. The studies based on a general equilibrium framework show that the impact of FKI is dependent on the structure of the economy. In presence of distorted prices, FKI has a welfare worsening impact [Buffie (1985)]. Abrego (1999) also found that partial trade liberalisation with taxation on free mobility of capital reduces gains.

IV. METHODOLOGY

Impact of foreign capital inflow (aid) on poverty depends on the sectors that receive these inflows [White (1996)]. Therefore an analysis that explicitly takes into consideration various sectors (import competing or export) give more insights into the mechanism of poverty reduction. Poverty orientation of foreign capital inflow relates to the rise in demand for factors of production in different sectors of the economy with increased inflow of traded goods and trace the impact on rich and the poor through changes in factor rewards and prices. The main thrust of the argument is that increased foreign capital inflows increases the demand for goods for investment purposes. Firms shift their resources towards the sheltered sectors in the presence of trade restrictions. In the presence of trade restrictions, demand for factors of production, used intensively in the import competing sectors (capital), increases and as such rich, the owner of capital are expected to benefit more. A trade-induced change in the country's product prices alters the relative profit opportunities facing price-taking firms who shift their resources towards the industries whose relative profitability has risen. Given fixed factor supplies, the shift in demand changes factor prices until the zero profit condition is restored. The distribution of cost and benefit depends on the following:

(1) Factor specificity to import competing and export oriented industries.

(2) Ownership of factors of production.
(3) Consumption Pattern.

This study focuses on the changes in distribution of factors' returns due to foreign capital inflow in the absence and presence of trade liberalisation to different social groups such as workers and owners of capital. Starting with a simple macro identity we get the equation identifying the need of foreign capital inflows. The national accounting identity can be written as follows:

$$Y = C + I + EX - M \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (1)$$

Where 'Y' is total domestic supply of ith commodity, 'C' is aggregate demand, which includes households consumption, government current consumption, and intermediate demand from production sectors, 'I' is total investment, and 'EX' and 'M' are exports and imports respectively.

Since

$$S = Y - C \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (2)$$

where 'S' is saving

We get the following identity.

$$I - S = M - EX. \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (3)$$

S signifies as national savings. This implies that foreign savings (trade deficit or foreign exchange gap or trade gap) fill the saving investment gap.

In the Computable General Equilibrium model for Pakistan, we have different types of foreign capital: transfers to households, transfers to government, and current account balance in terms of foreign savings. In the study, foreign capital inflow, in terms of foreign savings, and domestic economy is related in the following way.

$$M - X + TRh + TRg - TRf = CAB \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (4)$$

Where

M = Imports
X = Exports
TRh = Remittances to house from abroad
TRg = Transfers to government from abroad
TRf = Transfers from firms to rest of the world
CAB = Current Account Balance (foreign saving)

In the equation, last three terms on the left side are exogenously fixed, while imports and exports are determined endogenously. CAB is also exogenous. The gap between foreign exchange earnings and import bill show the requirement of foreign capital inflow. In the absence of the financial sector, and focusing on the real sector of the economy, the current account balance determines the amount of foreign saving (import surplus) in the country. The movement of capital takes place through a transfer of goods

across the countries,[5] [Borts (1960)]. Or Capital movement in equilibrium is the excess of investment over domestic savings, equal in magnitude to the current account balance of payments [Baldwin (1971) and Oniki and Uzawa (1995)]. The main thrust of the argument in the CGE framework is that the increased current account deficit increases the demand for goods for investment purposes. This can be seen from the following equation,

$$SH + SF + SG + CAB = TI \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (5)$$

Where

SH = Household Saving
SF = Firms Saving
SG = Government Saving
CAB = Current Account Balance (foreign saving)

Increase in foreign saving lead to increased demand for investment. This increased demand is fulfilled by increase in imports and increased supply of domestic production. This increase in demand leads to resource reallocation, which ultimately changes factor remuneration and prices. As a result households' real income, consumption, and poverty level in the country change. In addition, tariff elimination on capital goods increases the inflow of imports of capital goods, and reduces the price of capital goods, which benefit more the rich households, and income inequality may increase. Lastly, trade liberalisation; tariff reduction on all imports increase the inflow of imports. Due to cheap imports, consumers substitute imports for domestically produced goods. The gain from this depends on the reallocation of factors of production, factors' ownership as well as consumption.

In this study, the impact of foreign capital inflow in presence and absence of trade liberalisation is simulated in two alternative setups of the economy.

- Labour mobile across the sectors (LMS) and capital sector specific (KSS).
- Labour sector specific (LSS) and capital mobile across the sectors (LMS).

In the first set up we assume that labour is homogenous (of same qualification) and can move quickly from one sector to the other sector and capital is sector specific. In the presence of trade-restrictions, resources move towards the import competing sectors and benefit more the capital owners (the rich). While in the presence of trade liberalisation, sheltered sectors contract and labour moves towards the expanding sectors, export, and benefits more the labour owner (the poor). Liberalisation is considered a means of reducing inequality through increased demand for labour, the most abundant asset of poor people. In the second scenario, we assume that labour is sector specific and is further differentiated by sector of activity. FKI in the absence/presence of trade liberalisation affects returns to different type of labour. Educated labour employed in import competing sectors may gain after increase in foreign capital inflow in the presence of trade restrictions (or *vice versa*).

[5]Thus a country which is importing capital has a surplus in its balance on capital account and a deficit in its balance on current account that is, the level of investment in the country exceeds the level of savings.

V. MAIN FEATURES OF THE CGE-MODEL FOR PAKISTAN

The basic framework of the General Equilibrium Model for Pakistan is taken from the model developed for MIMAP-Pakistan[6] for trade policy analysis. It focuses explicitly on households' factorial income distribution and their spending pattern to show poverty outcome of increased foreign capital in terms of foreign savings in presence of different trade policies. Foster-Greer-Thorbecke (FGT) (1984) indices of poverty (Pα measures) are used to measure the proportion of poor (head count, or P0), depth (P1) and severity of poverty (P2).

In the neo-classical framework, the model contains six blocks of equations; production, income and saving, demand for commodities, prices, foreign trade and market equilibrium. It is static in nature. For algebraic tractability of equations, see Annex 2. In this section, the main features of CGE model are described.

The production sector is aggregated into eleven sectors from 82x82 input-output matrix. These eleven activities are further classified into four broad categories: agriculture, mining, manufacturing, and others. The agriculture sector includes the crop sector and non-crop sector. Mining is aggregated into one sector and manufacturing sectors are aggregated into 5 sectors; consumer goods (food), textile, chemicals, machinery, and other miscellaneous manufactured goods. These major sectors produce goods for both the domestic and foreign markets. The remaining sectors grouped into three sectors, two traded sectors and one non-traded sector. These sectors employ two primary factors of production, labour and capital. We make two assumptions alternatively; (1) Labour is homogenous and mobile across the sectors while capital (initially) is assumed to be sector specific. (2) Labour is differentiated by sectors according to their qualification and cannot move across the sector, while capital is mobile across the sector. In this scenario, foreign capital inflow determines the impact on returns to different type of labour.

For poverty analysis, we classified households in rural and urban areas; and households have been grouped into five socio-economic groups[7] in each area. They are aggregated based on the occupation of the head of the households: professional, clerks, agriculture, production worker, and others (miscellaneous).

1. Traded Sector

The traded sector is particularly important in the analysis of foreign capital inflow in the presence of different trade policies. In the model, we differentiate the economy into traded and non-traded sectors. Following assumptions have been made:

(1) The country is a price taker (small country assumption) for exports as well as for imports. World prices of exports P_n^{WE} and P_n^{WM} are given for traded sectors.
(2) Goods for the domestic market and for the external market with the same sector classification are of different qualities.

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[6]Micro Impact of Macro Adjustment Policies, project funded by IDRC, Canada.

[7]We are thankful to Mr Masood Ishfaq, Systems Analyst, Computer Section, Pakistan Institute of Development Economics, Islamabad for helping us in preparing Households Integrated Economic Survey (HIES) data [Pakistan (1993)].

(3) Domestically produced goods sold in the domestic market are imperfect substitutes of imports (Armington assumption).
(4) Profit maximisation gives export supply and import demand as functions of relative prices.
(5) The Constant Elasticity of Transformation (CET) function describes the possible shift of domestic production of goods for domestic and external markets.
(6) Import aggregation function presents demand for composite goods (imported and domestically produced goods). We define it with Constant Elasticity of Substitution (CES).

The non-traded sector is as important as the traded sector. The composition of traded sectors is determined independent of the non-traded sector, but the level of each activity in the traded sector is constrained by activity in the non-traded sector. In the model, demand for non-traded goods is equal to the domestic supply of that sector.

Exports and imports are flow of goods to and from the rest of the world, respectively. In addition, we have different types of transfers in the model: transfers from the rest of the world in form of remittances to households, transfer from rest of the world to government, and transfer from firms to the rest of the world. Foreign capital inflow (foreign savings) fills the gap between expenditure (exports+ transfers to households and transfers to Government) and foreign exchange earnings (imports+transfers from firms). It is defined in the model in Equation 6.

2. Income and Saving

The model has four institutions; households, firms, government and rest of the world. The households' main sources of income are labour and capital. The ownership of the factors of production, wage rate and returns to capital determine their factor income. In addition, households' receipts include dividends that they receive from firms. These three income receipts are determined endogenously in the model. They also receive private transfers from the rest of the world and transfers from government as social security benefits. These transfers are fixed exogenously in the model.

The effect on income of households after increased foreign capital inflows in terms of foreign savings to the economy is determined through changes in the endogenous sources of income; wage income, capital income, and dividends from firms. After subtracting income taxes from the households' income, we get disposable income of households. Saving is defined as a fixed share of disposable income and the rest is consumed.

The second institution is the firm. Firms receive income from capital and transfers from the government. Transfers from government to firms are given exogenously. Its expenditure includes tax payments to the government, dividends to the households, and transfers to the rest of the world. The residual is saving of the firms.

The third institution is government. The model captures government revenue from direct and indirect taxes. Tax revenue includes taxes on imports and exports. In addition, there are taxes on production, tax on households' income and tax on capital income of the

firms. These five types of taxes determine government revenue endogenously. In addition government also receive income from the rest of the world (TR_{RG}), which is fixed exogenously. Its expenditure include current expenditure on goods and services, transfer payments to households, and transfers to firms. After subtracting expenditure from income, rest is saved.

The fourth institution is the rest of the world. It receives income from the sales of imports, which is determined endogenously in the model. Transfers from firms to the rest of the world are fixed exogenously. Its expenditure includes expenditure on exports, remittance income to households and transfers to government. These are defined in the trade block.

3. Structure of Production

Domestic production has eleven sectors: ten tradable and one non-tradable. All tradable sectors have import and export. However, we can classify them as import competing sectors and export-intensive sectors. We identify the major export sector 'Textiles' (the share of export from this sector is 67.7 percent) and the major import sector 'Machinery', (the share of imports from this sector is 37.5 percent).

Production functions in the model are specified by a technology in which gross output has separable production function of value added and intermediate inputs. Leontief technology is assumed between intermediate good and final output and within intermediates. Production is carried out in the recipient economy by combining labour and physical capital. The production functions are defined by Constant Elasticity of Substitution (CES). Assuming perfect competition and market clearing conditions, labour demand function for each sector is derived from production function. In the first scenario, returns to labour are determined through equilibrium in labour market, while returns to capital is determined in each sector with zero profit condition and vice versa.

4. Demand

There are four types of domestic demand for goods and services, households' consumption, government consumption, intermediate input demand for the production sector and demand for goods for investment purposes. Total household consumption is defined as residual after subtracting saving from disposable income. Household demand for *i*th commodity C_{Hi} defined by a Linear Expenditure System (LES) is derived from maximising a Stone-Geary utility function subject to the household's budget constraint.[8]

Government expenditure includes current expenditure, transfers to the households, and transfers to the firms. Government expenditure on *i*th commodity is derived by the Cobb Douglas utility function. Total demand for consumption of *i*th good is equal to private and public consumption of goods. Intermediate demand is defined by the Leontief technology between output and intermediate consumption and within the intermediate consumption. Demand for goods for investment purposes is determined by fixed value share, β^i_I, which is calculated from base year data and the sum of all β^i_I is equal to one.

[8]Maximising $u(X) = \sum fi\ (Xi) = \sum \alpha_i - log(\gamma_i)$ *subject to constraint* $\sum P_i X_i = Y$.

Total demand for investment is equal to supply of domestic saving plus foreign savings (FKI). The aggregate demand for goods of the country is sum of households' consumption; government consumption, intermediate consumption and investment goods.

5. Prices

Producer price (P_i) is determined by the weighted average of domestic price of goods for domestic market before taxes (Pt_i) and price of goods for external market, export (P_i^E). Value added price is determined by factor prices. There is sales tax on all goods, domestic price (P_i^D) is determined after including taxes in producer prices (P_i). We retain the small country assumption for all imports and exports. So world prices of exports (P_n^{WE}) and imports (P_n^{WM}) are given. Domestic price of exports and imports are defined after including domestic taxes. For example, domestic price of imports are determined after including tariffs and the incidence of sales tax in world price of imports. In the model, trade liberalisation is determined through a cut in the tariff rate. Taxes on exports may be subsidy (negative tax) on exports. Consumer prices are the weighted average of domestic prices and import prices of commodity for traded goods. While for non-tradable good, consumer price is equal to domestic price (P_i^D). GDP deflator is defined by the weighted price index of all goods.

6. Equilibrium

We assume full employment of factors of production. Labour demand is equal to labour supply, which is fixed exogenously. Equilibrium in the labour market determines the single wage rate prevailing in the economy. At the second stage, we assume that labour is sector specific and supply of each type of labour is fixed. In that scenario the wage rate is sector specific. The same is the case for capital.

For the investment-saving equilibrium, the gap between domestic investment and domestic saving (comprising of household saving, firm saving and government saving) is filled by foreign saving, which we use as foreign capital inflow.

$$IT - \sum S_H + S_F + S_G = \bar{e} * CAB$$

Where IT is total investment.

Walras' law holds, if n–1 markets are in equilibrium nth market is also in equilibrium.

7. Poverty Analysis

Poverty analysis is sensitive to the choice of fiscal policies for the compensation of the decline in government revenue. The impact of increased foreign savings may be off set by an increased fiscal deficit due to the reduction in tariffs in absence of any other compensatory measure. We have fixed government consumption in real terms. In presence of trade liberalisation, foreign capital inflow compensates for loss in government revenue and government consumption remains at the base level.

Poverty analysis is based on Foster Greer and Thorbecke (F-G-T), $P\alpha$ measures, i.e., head count (P_0), income gap (P_1) and severity index(P_2). For poverty analysis, we focus on change in income of households and monetary value of poverty line after simulation. These two changes determine the percentage change in households below the poverty line after the policy shock. The poverty line is determined by the basket of commodities required to satisfy basic needs.

Using basic need poverty lines, we estimate poverty indicators using micro data from The Household Integrated Economic Survey [Pakistan (1993)] through the DAD programme [Duclos, *et al.* (2001)]. For detail see Siddiqui and Kemal (2002). Poverty estimates (FGT $P\alpha$ measures) are presented in Table 9. It shows that 19.9 percent and 23.4 percent households are below poverty line in professionals and miscellaneous group of households in the urban area, which can be classified as rich households. The incidence of poverty, in the urban areas, amongst production workers, agriculture worker and clerks has been quite high, 40.1 percent, 35.3 percent, and 31.5 percent respectively. These households can be classified as poor group of households. In the rural area the higher percentage of households, who are below the poverty line are production worker, 36.3 percent of households in this group are those who consume less than Rs 264 per capita per month. However, 25.2 percent and 23.2 percent households are below poverty line in professional group of households and miscellaneous group of households, respectively, in rural area. Here former can be classified as poor households and latter as rich households.

8. Model Closure

Foreign savings (Current Account Balance) is exogenous to the model and used to simulate the impact of FKI on poverty. We assume price-taking behaviour for exports as well as for imports in the international market[9]. The nominal exchange rate acts as the numeraire. Its value is set equal to one. The real exchange rate is implicit in the model and is calculated in the following way

$$er = e * (P^w / Pindex)$$

In this equation the nominal exchange rate and world prices are given.

In the present analysis, government consumption and tax rate on production are fixed. It shows that a reduction in tariffs does not affect government consumption but loss in government revenue may be compensated by FKI or increase in the fiscal deficit. Increase in investment is not at the expanse of government consumption. Price indices for government consumption adjust. Reduction in tariff reduces government revenue very significantly and foreign capital inflow serves as a compensatory measure. Households' savings and government savings adjust endogenously with the change in income and consumption. With the equilibrium between saving and investment, increased foreign savings directly lead to increase in investment demand if it does not displace fiscal deficit or private savings. Supply of primary factor of production is exogenously given. Wage rate adjusts to keep equilibrium in the labour market.

[9]Small open economy assumption.

9. Data and Calibration

A consistent data set for the benchmark year 1989-90 in the form of Social Accounting Matrix has been prepared using an input-output table [Pakistan (1996)], HIES [Pakistan (1993)] and SAM 1989-90 [Siddiqui and Iqbal (1999)].

Table 8 shows the main characteristics of production sectors in SAM, machinery (capital goods) has the largest share in total imports; 37.5 percent, while exports of textiles contribute 67.7 percent in total exports. These are two major sectors, import competing and export oriented, respectively. The next two columns again show the importance of these two sectors in the economy. More than 55 percent expenditure on machinery is fulfilled from imported machinery and 44.6 percent of textiles production goes to the external market. Among the manufactured goods, the largest share of labour and capital income is in the textile sector. Table also shows qualification of labour by sector of activity. It shows among the traded sectors relatively less educated labour is employed in agriculture and textile, while relatively more educated labour is employed in the import-competing sectors, 'Machinery' and 'Chemicals'.

Table 8

Structure of Base Year Economy (Percentages)

Sectors	Imports Share	Exports Share	Imports Share in Domestic Demand	Exports Share in Domestic Production	Labour	Capital	Skill Raking Based on Education
Crop	6.11	1.70	3.57	0.67	20.14	27.67	2
Non-crop	0.23	1.31	1.44	5.14	1.65	3.66	1
Mining	7.84	0.77	35.99	3.52	2.99	2.60	8
Food	8.52	6.91	9.98	5.59	2.58	3.78	5
Textile	1.91	67.66	3.34	44.60	6.84	5.19	4
Chemicals	18.35	1.21	30.88	1.90	1.10	1.07	9
Machinery	37.51	0.35	55.63	0.77	2.45	1.86	7
Other Manufacturing	11.23	2.66	17.97	3.30	5.60	4.12	3
Other Trade Sector 1	2.94	17.42	1.53	5.70	19.91	36.72	6
Other Trade Sector 2	5.35	0.01	18.67	0.03	11.71	2.18	10
Non-traded Sector	–	–	–	–	25.03	–	11
Total*	100	100	13.11	9.04	100	100	

Households are classified by occupation of head of the households in the urban as well as in the rural areas. Household aggregation is based on the data in the Household Integrated Economic Survey [Pakistan (1993)]. Table 9 shows that professional workers in urban areas receive 59 percent of their annual income from wages. The mean education of the head of the household in this group is the highest in the urban area. We assume that skill is related with education. This means that these households receive income from skilled labour. On the other hand, mean education of the head of the households of production workers is around two years; production workers receive 51.5 percent of their income from labour (skilled). All other households in the urban area receive a larger share of their income from capital. Among the rural households, only production workers receive a larger share from labour. The mean education of this group is 1.7 years. A large proportion of the income of production workers in rural areas comes from wages; 56.8

Table 9

Sources of Households Income and Labour Qualification

	Wages	Capital	Dividends	Others	Mean Education*	Households Below Poverty Line
Urban Household					2.62	32.44
Professional	59.46	24.23	14.81	1.51	5.53	19.92
Clerks	28.53	38.41	18.86	14.19	2.85	31.52
Agriculture Worker	13.01	76.42	0.00	10.57	1.69	35.33
Production Worker	51.52	34.38	5.15	8.96	2.06	40.08
Miscellaneous	23.52	63.58	1.72	11.19	2.82	23.44
Rural Households					1.88	30.47
Professional	19.18	80.48	0.00	0.34	4.35	25.20
Clerks	38.95	56.53	0.01	4.51	2.35	34.25
Agriculture Worker	13.82	81.56	0.43	4.20	1.52	28.30
Production Worker	56.77	31.22	3.75	8.27	1.70	36.30
Miscellaneous	16.98	54.37	19.22	9.44	1.82	23.19

Source: Social Accounting Matrix for 1989-90.

* Head of the Households.

percent. All other groups in the rural areas receive a larger share of their income from capital. The professional group, on the other hand, is the only household group where people are relatively highly educated and they receive 80 percent of their income from capital. In both areas, urban and rural, agricultural labour is least educated and have the lowest ranking by skill.

The calibration procedure involves the construction of consistent data sets and the estimation of parameters. The model given in Annex 2 has been calibrated to data of Pakistan economy for the year 1989-90. Four sets of elasticities, are necessary to implement the model; households income elasticities of consumption goods, elasticity of substitution between labour and capital in production, elasticity of transformation between domestic and export goods, elasticity of substitution between imports and domestic goods. Elasticities of substitution for industrial production functions are taken from Kemal (1981) and Malik, *et al*. (1989). We estimated households' specific income elasticities for each commodity using micro data of households' income and expenditure from 'Household Integrated Economic Survey' [Pakistan (1993)]. In addition, a value for the Frisch parameter is set equal to (–2) to derive the remaining parameters of the linear expenditure system (LES). We assume reasonable values for parameters, which are not available from the existing studies, to complete the calibration process.

Policy parameters, like tax rates, are calculated from the base year data. Shift and share parameters in demand and supply equations, are also generated from the SAM. The GAMS software package is used to solve model.

10. Shocks

Various approaches are taken toward getting a better understanding of the affects of foreign capital inflows on poverty. The impact of the following three shocks to the economy is evaluated in the subsequent section.

(1) Increase in Foreign capital by 70 percent in the presence of trade restrictions.
(2) Increase in Foreign capital by 70 percent and tariff elimination on imports of capital goods (free mobility of capital goods).
(3) Increase in Foreign capital by 70 percent and tariff reduction by 80 percent on all imports.

VI. SIMULATION RESULTS

The results of the exercises corresponding to all the three shocks reported above are presented in Tables 10 to 15. They show percentage changes in the demand for goods for investment purposes, sectoral employment, wages, sectoral output, product prices, and poverty in Pakistan etc.

A. Impact of Foreign Capital Inflow when Labour is Homogeneous

Simulation 1. Increase in FKI by 70 Percent without Trade Liberalisation

The increased foreign capital (foreign savings) mean a larger inflow of imports[10] as foreign transfers are fixed in the model. This is saving driven model and increased foreign savings (foreign capital flows) lead to increased demand for investable goods and in turn an increase in the demand for factors of production. In the presence of trade restrictions, foreign capital benefits more the import competing[11] sectors. Demand for investment increases by a higher percentage in the sheltered sectors due to high profitability of these sectors. A comparison of the major exportable sector 'Textile' and major import competing sector 'Machinery' shows that import competing sectors expand and export oriented sectors contract after the shock. It leads us to conclude that foreign capital inflow leads to an inefficient use of resources in the presence of trade restrictions. This is indicated in the demand for factors of production. In the import competing sector 'machinery', demand for labour increases by 13 percent that may lead to increase in overall returns to labour. Similarly, demand for capital increases in this sector, which result in increase in returns to capital by 17.3 percent.

[10]This has the same effect as trade liberalisation as far as the inflow of imports is concerned.
[11]As they are more beneficial in presence of trade restrictions.

Contrary to this demand for labour and capital fell in 'Textiles'. Demand for labour decline by 15.2 percent. Demand for capital also declined which lead to decline in its return by 4.4 percent over the base run in this sector (see Table 10). The output of these sectors show the same trend, the output of 'Machinery' increase by 4.2 percent and the output of 'textile' decline by 5.3 percent. This may be called *Dutch Disease,* when resource inflow benefits one, import competing sector and harms the other, export-oriented sector. The results show that increased factor demand mostly in 'sheltered' sectors dominates the decline in factor demand in less sheltered sectors, which is indicated in their rate of returns; wage rate increases by 2.5 percent and returns to capital index increase by 3.9 percent.

The domestic price rise as the cost of production increases due to an increase in factor prices. As a result of the increase in domestic prices relative to world prices, exports become expensive and they decline from all the sectors.

Prices increase by small amount where the share of imports is larger in total consumption as well as in total imports. As increase in domestic prices is partially offset by an increased supply of output and larger inflow of imports. Accordingly, consumer prices of 'Machinery' increases by 2 percent while the consumer price of the 'Textiles' increase by 4.2 percent. As a result, textile products become expensive, exports of textiles decline by 8 percent and export of machinery decline by 1.1 percent.

The change in factor returns in production activities affects households nominal income. As mentioned above that increase in returns to capital is larger than the increase in wages. The income of households who receive a larger share from capital increases by a higher percentage than the households income who receive a larger share from labour (see Table 11). In urban areas, the highest increase is in the income of agriculture and miscellaneous group of households who receive, respectively, 76 percent and 64 percent of their income from capital. Their income increases by 3.3 percent and 3.2 percent respectively. The same pattern is found in rural households, production workers earn a larger share of their income from labour. Their income increase only by 2.8 percent. This implies that inflow of foreign saving benefits more the capital owners in the presence of trade restrictions. Overall income of urban and rural households increases by 3 percent and 3.3 percent, respectively.

Households' specific consumer price indices increase for each household in urban and rural areas. The increase in household specific consumer price index (CPI) is larger than the increase in nominal income for all households except for agriculture and miscellaneous group of households in urban area. In rural area, increase in CPI is larger than increase in income for production workers only. This means, in the urban area, an increase in the real income of agriculture and miscellaneous group. In the rural areas the real income of all households increases except that of production workers, poor. However, the real incomes of the urban households decline but the real incomes of the rural households increase. Table 12 shows that poverty declines by all measures in the urban and rural areas. However, the decline in poverty is higher in rural area. Household specific poverty impact is discussed in poverty comparison section in the subsequent section.

Table 10

Simulation Results: Percentage Change Over Base Year Values
(Mobile Labour)

Variables Defined Over *i*	Crop	Non-crop	Mining	Food	Textile	Chemical	Machinery	Other Manufac-turing	Other Traded 1	Other Traded 2	Non-traded	Total
Simulation 1. Increase in FKI by 70% in Absence of Trade Liberalisation												
Output	–0.2	0.01	–0.51	–0.2	–5.28	–0.96	4.21	0.46	0.78	–0.01	0.23	–0.43
Rate of Return to Capital	1.41	2.49	0.59	1.27	–4.45	–1.77	17.33	4.44	7.65	2.43	2.95	3.94
Labour Demand	–0.92	0.06	–1.64	–0.93	–15.24	–3.31	12.97	1.35	4.55	–0.02	0.34	–
Wage Rate	2.46	2.46	2.46	2.46	2.46	2.46	2.46	2.46	2.46	2.46	2.46	2.46
Imports Share (Base)	6.11	0.23	7.84	8.52	1.91	18.35	37.51	11.23	2.94	5.35	–	100
Exports Share (Base)	1.70	1.31	0.77	6.91	67.66	1.21	0.35	2.66	17.42	0.01	–	100
Consumer Price	2.35	3	1.28	2.91	4.16	1.59	1.99	2.67	5.37	2.81	2.26	3.14
Imports	2.28	4.86	1.97	4.08	2.34	2.35	9.88	5.17	6.7	2.45	–	5.74
Domestic Demand	–0.18	0.2	–0.46	0.07	–3.16	–0.89	4.25	0.63	1.07	0.23	–	0.19
Exports	–3.04	–3.66	–2.04	–4.73	–7.97	–4.5	–1.09	–4.37	–4.26	–2.21	–	6.75
Investment Demand	13.26	12.55	14.46	12.64	11.3	14.11	13.66	12.9	10.02	12.75	13.37	15.92
Simulation 2. Increase in FKI by 70 Percent in Presence of Tariff Elimination on Import of Capital Goods												
Output	0.17	0.16	–0.27	0.29	–1.83	–0.05	–1.26	0.04	0.15	0.2	–0.09	–0.19
Rate of Return to Capital	2.49	2.32	0.63	3.34	–0.74	1.37	–2.54	1.78	2.59	2.13	1.39	2.14
Labour Demand	0.79	1.07	–0.86	1.37	–5.37	–0.18	–3.67	0.12	0.88	0.42	–0.14	–
Wage Rate	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60
Consumer Price	1.64	1.75	0.49	1.48	1.71	0.51	–16.36	0.8	1.34	–1.24	0.88	–0.52
Import Price	0	0	0	0	0	0	–22.42	0	0	0	0	–8.58
Imports	1.91	2.98	0.68	2.47	1.4	1.01	20.56	1.44	1.63	0.77	–	8.56
Domestic Demand	0.19	0.28	–0.24	0.42	–0.91	–0.03	–1.31	0.09	0.23	–0.09	–	0.03
Exports	–1.82	–2.01	–0.86	–2.08	–2.99	–1.21	4.64	–1.44	–1.15	–1.06	–	–2.47
Investment Demand	0.47	0.36	1.62	0.62	0.4	1.6	22.1	1.3	0.76	3.4	1.23	2.12
Simulation 3. Increase in FKI by 70 Percent in Presence of Trade Liberalisation (80 Percent Reduction in Tariff)												
Output	0.71	–0.04	–2.28	0.32	1.36	–4.13	–2.79	–2.65	–0.15	0.2	0.41	–0.24
Rate of Return to Capital	6.14	2.25	–5.7	4.39	4.15	–14.68	–6.6	–8.23	1.43	2.98	3.31	2.33
Labour Demand	3.26	–0.26	–7.17	1.53	4.04	–13.6	–7.97	–7.4	–0.87	0.43	0.61	–
Wage Rate	2.43	2.43	2.43	2.43	2.43	2.43	2.43	2.43	2.43	2.43	2.43	2.42
Consumer Price	2.2	–0.21	–3.02	–1.84	–1.38	–9.04	–14.22	–8.15	–1.49	–1.1	0.93	–2.86
Import Price	–3.73	–30.11	–2.19	–16.57	–15.99	–16.54	–17.92	–18.70	–0.04	0		–14.53
Imports	7.24	72.99	–3.93	25.42	25.57	14.17	9.28	19.17	–1.74	1.32		11.22
Domestic Demand	0.73	0.01	–2.38	0.36	0.99	–4.26	–2.85	–2.9	–0.24	0.41	0.73	–0.42
Exports	–2.14	–0.91	0.43	–0.34	1.81	2.47	5.63	4.56	1.32	–0.61	–	1.56
Investment Demand	–8.8	–6.6	–3.9	–5.05	–5.5	2.46	8.65	1.48	–5.39	–5.76	–7.65	–6.8

Table 11

Simulation Results: Households' Sources of Income and Variation Over Base Year after the Shock to the Economy (Labour Mobile) (Percentages)

Households	Share Households Income (Base Year)			Increase in FKI by 70 Percent in					
				Absence of Trade Liberalisation		Presence of Tariff Elimination on Import of Machinery		Presence of Trade Liberalisation (80 Percent Reduction in Tariff)	
	Labour	Capital	Dividends	Nominal Income	Households Consumer Price Index	Nominal Income	Households Consumer Prices	Nominal Income	Households consumer Prices
Professional	59.46	24.23	14.81	3.00	3.05	1.78	0.62	2.35	–1.43
Clerks	28.53	38.41	18.86	2.96	3.06	1.68	0.92	2.03	–1.18
Agriculture Worker	13.01	76.42	0.00	3.33	3.04	1.84	1.09	2.09	–1.11
Production Worker	51.52	34.38	5.15	2.82	3.05	1.67	1.02	2.17	–1.09
Miscellaneous	23.52	63.58	1.72	3.15	3.10	1.77	0.63	2.09	–1.34
Urban	–	–	–	**3.02**	**3.06**	**1.73**	**0.85**	**2.12**	**–1.03**
Professional	19.18	80.48	0.00	3.65	2.91	2.03	1.16	2.26	–0.93
Clerks	38.95	56.53	0.01	3.19	2.95	1.83	1.21	2.24	–0.60
Agriculture Worker	13.82	81.56	0.43	3.57	2.89	1.97	1.33	2.19	–0.83
Production Worker	56.77	31.22	3.75	2.77	2.94	1.65	1.26	2.17	–1.01
Miscellaneous	16.98	54.37	19.22	3.32	2.95	1.84	1.25	2.34	–0.99
Rural	–	–	–	**3.33**	**2.92**	**1.88**	**1.27**	**2.11**	**–1.22**
Total	–	–	–	**3.17**	**2.99**	**1.797**	**1.06**	**2.23**	**–0.80**

Table 12

Simulation Results: Variation in FGT Indices of Poverty (Labour Mobile)

	Head Count				Poverty Gap				Severity			
Households	Base	1	2	3	Base	1	2	3	Base	1	2	3
Professional	19.92	–1.76	–1.76	–17.57	4.68	–3.45	–5.04	–13.26	1.15	–3.48	–4.35	–13.04
Clerks	31.52	–0.22	–2.66	–9.23	3.77	–1.08	–3.10	–9.96	2.42	–1.65	–4.13	–12.81
Agriculture Worker	35.33	–6.26	–13.13	–16.39	7.43	–3.81	–5.63	–15.43	1.44	–4.17	–6.25	–16.67
Production Worker	40.08	0.00	–1.90	–7.78	5.51	0.11	–2.56	–10.01	1.26	0.31	–3.08	–11.38
Miscellaneous	23.44	–2.05	–2.01	–3.80	9.39	–1.92	–4.06	–13.46	3.25	–2.38	–4.76	–16.67
Urban	**32.44**	**–0.74**	**–2.81**	**–8.66**	**7.27**	**–0.83**	**–3.16**	**–10.73**	**2.36**	**–0.85**	**–3.39**	**–12.71**
Professional	25.2	1.23	1.23	–5.16	5.2	–2.88	–2.88	–13.46	1.42	–3.52	–3.52	–16.90
Clerks	34.25	–0.85	–1.23	–6.83	7.38	–1.08	–2.03	–12.47	2.33	–0.86	–2.15	–14.16
Agriculture Worker	28.3	–2.23	–2.23	–9.12	6.43	–2.18	–17.88	–11.04	2.12	–2.83	–2.83	–13.21
Production Worker	36.3	0.00	–1.79	–10.06	7.31	0.55	–1.50	–12.72	2.22	0.90	–1.35	–14.41
Miscellaneous	23.19	–3.79	–3.79	–13.89	4.58	–1.53	–1.97	–13.10	1.41	–2.13	–2.84	–14.89
Rural	**30.47**	**–1.44**	**–2.03**	**–9.39**	**6.49**	**–1.08**	**–2.00**	**–12.02**	**2.05**	**–1.46**	**–2.44**	**–14.15**

1. Increase in FKI by 70 percent in presence of trade restrictions.
2. Increase in FKI by 70 percent in presence of free Import of Capital Goods (Tariff Elimination on Capital Goods).
3. Increase in FKI by 70 percent in presence of Trade Liberalisation (80 percent reduction in Tariff).

Table 13

Simulations Results: Percentage Variation Over Base Year (Labour Sector-specific)

Production Activities	Skill Level (Skill Ranking)	Increase in FKI by 70% in Absence of Trade Liberalisation		Increase in FKI by 70% in Presence of Elimination of Tariff on Machinery		Increase in FKI by 70% in Presence of Trade Liberalisation (80 Percent Reduction in Tariff)	
		Wage Rate	Returns to Capital	Wage Rate	Returns to Capital	Wage Rate	Returns to Capital
Crop	Unskill (2)	1.66	2.68	2.05	1.67	4.54	2.37
Non-crop	Unskill (1)	2.54	2.68	1.93	1.67	2.35	2.37
Mining	Skilled (8)	1.90	2.68	0.95	1.67	–5.28	2.37
Food Consumer	Skill (5)	2.33	2.68	2.58	1.67	3.62	2.37
Textiles	Unskill (4)	–2.10	2.68	0.07	1.67	4.03	2.37
Chemicals	Skilled (9)	1.28	2.68	1.52	1.67	–7.44	2.37
Machinery	Skilled (7)	13.24	2.68	–1.56	1.67	–4.98	2.37
Other Manufacturing	Unskill (3)	4.85	2.68	1.74	1.67	–6.31	2.37
Other Trade Sector 1	Skill (6)	4.58	2.68	1.97	1.67	1.77	2.37
Other Traded Sector 2	Skilled (10)	2.65	2.68	1.21	1.67	3.28	2.37
Non-traded Sector	Skilled (11)	2.74	–	2.10	–	2.81	–
All		2.87	2.68	1.68	1.67	2.05	2.37

Table 14

Simulation Results: Changes in Income and Price (Labour Sector-specific)

Households	Mean Education	Increase in FKI by 70 Percent in Absence of Trade Liberalisation		Increase in FKI by 70 Percent in Presence of free Import of Capital Goods		Increase in FKI by 70 Percent in Presence of Trade Liberalisation (80 Percent Reduction in Tariff)	
		Nominal Income	Consumer Price	Nominal Income	Consumer Price	Nominal Income	Consumer Price
Urban Households							
Professional	5.53	2.75	2.41	1.65	0.34	2.04	–1.28
Clerks	2.85	2.35	2.46	1.44	0.59	2.45	–1.14
Agriculture Worker	1.69	2.42	2.47	1.50	0.74	2.48	–1.30
Production Worker	2.06	2.54	2.47	1.53	0.68	2.38	–1.20
Miscellaneous	2.82	2.42	2.45	1.49	0.34	2.04	–1.23
Urban (Total)	**2.62**	**2.46**	**2.46**	**1.50**	**0.53**	**2.27**	**–1.20**
Rural Households							
Professional	4.35	2.71	2.46	1.67	0.81	2.28	–1.08
Clerks	2.35	2.63	2.48	1.60	0.85	2.38	–1.08
Agriculture worker	1.52	2.59	2.49	1.61	0.96	2.35	–0.99
Production worker	1.70	2.57	2.48	1.54	0.89	2.32	–1.41
Miscellaneous	1.82	2.46	2.47	1.52	0.88	2.39	–1.18
Rural (Total)	**1.88**	**2.58**	**2.48**	**1.58**	**0.90**	**2.38**	**–1.16**
Pakistan	**2.17**	**2.52**	**2.47**	**1.54**	**0.72**	**2.32**	**–1.18**

Table 15

Simulation Results: Variation in FGT Index of Poverty (Labour Sector-specific) (Percentages)

	Head Count				Poverty Gap				Severity			
	Base	1	2	3	Base	1	2	3	Base	1	2	3
Professional	19.92	0.00	–1.76	–17.57	4.68	0.80	–4.77	–15.38	1.15	0.87	–4.35	–15.65
Clerks	31.52	0.00	–3.08	–9.96	3.77	0.27	–3.36	–11.57	2.42	0.41	–4.55	–14.88
Agriculture Worker	35.33	0.00	–13.13	–19.53	7.43	0.54	–5.63	–17.97	1.44	0.69	–5.56	–19.44
Production Worker	40.08	1.02	–3.09	–9.83	5.51	0.43	–3.30	–11.71	1.26	0.62	–3.69	–13.23
Miscellaneous	23.44	0.00	–2.05	–4.22	9.39	0.21	–4.06	–14.53	3.25	0.79	–4.76	–18.25
Urban	**32.44**	**0.43**	**–3.45**	**–9.99**	**7.27**	**0.41**	**–3.58**	**–12.24**	**2.36**	**0.42**	**–4.24**	**–14.41**
Professional	25.2	2.86	1.23	–5.16	5.2	0.77	–3.08	–14.81	1.42	1.41	–4.23	–19.01
Clerks	34.25	0.00	–1.23	–8.61	7.38	0.27	–2.57	–13.55	2.33	0.43	–3.00	–15.02
Agriculture Worker	28.3	0.21	–2.23	–9.43	6.43	0.47	–2.33	–11.98	2.12	0.47	–2.83	–14.62
Production Worker	36.3	0.00	–3.11	–10.25	7.31	0.55	–2.46	–13.95	2.22	0.90	–2.70	–15.77
Miscellaneous	23.19	0.00	–3.79	–13.89	4.58	0.44	–2.40	–13.32	1.41	2.84	–2.84	–15.60
Rural	**30.47**	**0.10**	**–2.40**	**–9.94**	**6.49**	**0.46**	**–2.47**	**–13.10**	**2.05**	**0.49**	**–2.93**	**–15.12**

1. Increase in FKI by 70 percent in presence of trade restrictions.
2. Increase in FKI by 70 percent in presence of free Trade of Capital Goods.
3. Increase in FKI by 70 percent in presence of Trade Liberalization (80 percent reduction in Tariff).

Simulation 2. Increase in FKI by 70 Percent with Tariff Elimination on Import of Machinery

In this simulation we study the impact of foreign capital that increase the investable resources in presence of cheap capital goods. Elimination of import duty on import of machinery raises the inflow of capital goods. The increase in foreign savings in the country increases the demand for goods for investment in all sectors (see Table 10). The increased demand is partially fulfilled by increase in imports from the external market. The elimination of tariffs on machinery reduces its domestic import price by 22.4 percent. Consumer substitute imported capital goods for domestically produced goods. The demand for imported machinery increases by the largest amount i.e., 20.6 percent. Demand for investment increases in all sectors. The change in relative prices leads to reallocation of factors of production. Contrary to the results in the first simulation, the demand for factors of production fell in machinery which is indicated in the decline in factor returns, wages and returns to capital.; –3.7 percent and –2.5 percent, respectively. In result, factors of production move from the former to the latter sectors. The increase in the relative prices of other goods affects domestic demand negatively; for example demand for textiles fell by 1.0 percent. Due to the increase in domestic prices exports become expensive resulting in a reduction in exports from each sector except from 'Machinery' where the domestic price declines (see Table 10).

The increased demand for investment leads to an increased demand for the factors of production. The results show that increased factor demand in the 'protected' sectors dominates the decline in factor demand in the less protected sectors, which is indicated in their rate of returns; wage rate increase by 1.6 percent and returns to capital increase by 2.1 percent. An increased inflow of foreign capital in the presence of cheap capital goods benefits more the owners of capital.

In this exercise, prices did not increase as much as in the case where tariffs restricted the imports of machinery. Due to a decline in the price of machinery the cost of production does not increase as much as in the absence of tariff reduction on machinery. Consequently, returns to capital and labour do not increase as much as in the previous exercise (see Table 10).

Nominal income of households increases because of the increase in returns to factors of production. The increase in returns to capital is larger than the increase in wages. This again benefits more to capital owners. A comparison of the results in the first simulation with the results in the second simulation show that the maximum increase is still in the income of agricultural households in the urban area and least increase is for the production workers. In rural areas, the gain in terms of income is again highest for the professionals who receive 80 percent of their income from capital. The lowest increase is in the income of the production workers, who earn 57 percent from labour. The aggregate income of urban and rural households increases by 1.7 percent and 1.9 percent respectively.

In this exercise, the consumer price index increases for each household but the increase in the price index is lower than the increase in the nominal income for all households in the urban as well as in the rural areas and leads to a increase in households' real income.

Simulation 3. Increase in FKI in Presence of Trade Liberalisation (Tariff Reduction by 80 Percent on All Imports)

The tariff reduction reduces the price of all the imported goods. As a result imports become cheaper and the demand for imports rise in the country. Increase in FKI in presence of trade liberalisation result in larger inflow of imports compared to in the last two exercises. Total imports increase by 11.2 percent, which is the largest increase amongst the three simulations (see Table 10). Tariff reduction on all imports reduces government revenue, which increases the fiscal deficit. The increase in foreign capital inflow (foreign saving) is partly off set by the increase in fiscal deficit.

A reduction in trade barriers, via a tariff reduction, leads to a decline in the domestic prices relative to world prices. Prices decline by higher percentage in the highly protected sectors (mostly manufacturing) and increase in prices of less protected sectors (agricultural crop sector). These changes in relative prices lead to a reallocation of resources from the former to the latter that leads to contraction of protected sectors and expansion of less protected sectors.

A reduction of distortion in domestic prices relative to world prices and consequent changes in factors demand lead to changes in factor returns. The wage rate increases by 2.4 percent and the index of returns to capital increases by 2.3 percent. This indicates that trade liberalisation benefits the more abundant factor of the country, labour, a result which is opposite to that from the first two exercises where increase in returns to capital is larger than the increase in wages (see Table 10).

The increase in wages is larger a little than the increase in returns to capital. The professional group (wage earner) gain maximum of 2.4 percent. Among households in the rural area, professionals and miscellaneous households show larger increase in income of 2.3 percent. In aggregate, the incomes of rural and urban households increases

by 2.1 percent in each area. Since the consumer price index for each household group declines, the real income of households rises.

Poverty Comparison

Poverty analysis is based on Pα measures. Indices are calculated using micro data from Households Integrated Economic Survey [Pakistan (1993)]. Basic need poverty lines are estimated based on adult equivalent calorie intake in the urban and the rural households separately; Rs 318 per capita per month for the urban and Rs 264 for the rural households. Table 12 presents information on the base year poverty and variation in poverty after the shock. It shows that the incidence of poverty with these poverty lines is highest among the production workers in the urban as well as in the rural area, 40.1 and 36.3 percent, respectively. Moving along the rows of urban and rural areas and comparing their values shows that poverty is higher in urban areas according to all measures (see Table 12).

In the first simulation an increase in consumer price shifts the poverty lines for rural and urban areas from Rs 318 and Rs 264 to Rs 327 and Rs 271.7 respectively. The shift in the poverty line is larger for the urban households as prices increase by larger amount in this area. The income of rural households increases more compared to urban households (see Table 11). With the change in the poverty line and income, the corresponding poverty level in each group also changes. All household groups benefit by an alleviation of poverty when measured either by P0, P1 or P2, except for the production workers in both urban and rural areas. These household groups earn relatively a larger share of their income from labour in urban as well as in rural areas. For this group head count ratio, Po, does not show any change, but poverty increases because of increase in poverty gap and severity. Only professional households in the rural areas show an increase in the percentage of households below poverty line. All the three Pα measure of poverty decline more for rural households compared to urban households in aggregate.

In the second simulation, the value of the poverty line increases more in rural areas, 1.27 percent compared to 0.85 percent in urban area. However income shows a larger increase in the rural areas. In this simulation poverty falls more rapidly irrespective of poverty measure in urban households than in the rural households.

The third simulation with the increase in foreign savings in the presence of tariff reduction on all imports shows that poverty reduces very significantly by all measures in every group of households in the rural as well as in the urban areas. If we compare the results of the first simulation with the results of the third simulation, it becomes clear that poverty reduction in the presence of trade liberalisation is larger than the poverty reduction in the absence of trade liberalisation.

To see the distributive impact of different shocks as shown in Cockburn (2002), we draw Figures 3 to 12 for variation in density function[12] for different households groups in the rural and the urban areas separately. All groups of households show movement of individuals from lower to higher income brackets in all simulations. The movement is larger among the lower income groups (200-500) compared to the movement in larger income groups. All graphs suggest that income disparity reduces after increase of foreign capital in the country.

[12]The density function shows the percentage of households with a given income.

Variation in Density Functions (Urban Households)

Fig. 3. Variation in Density Function (Professionals).

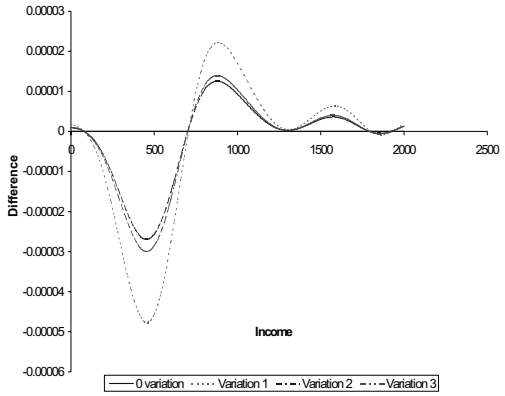


Fig. 4. Variation in Density Function (Clerks).

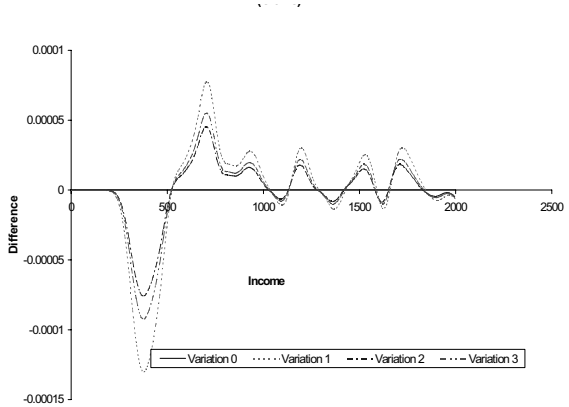


Fig. 5. Variation in Density Function (Agriculture).

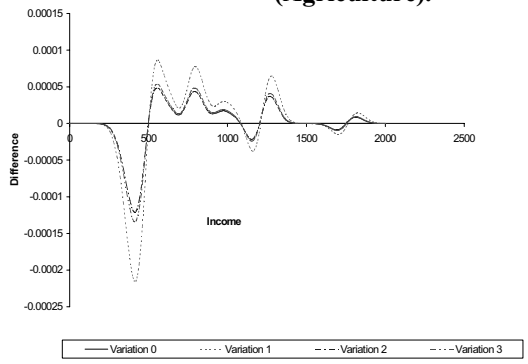


Fig. 6. Variation in Density Function (Production Worker).

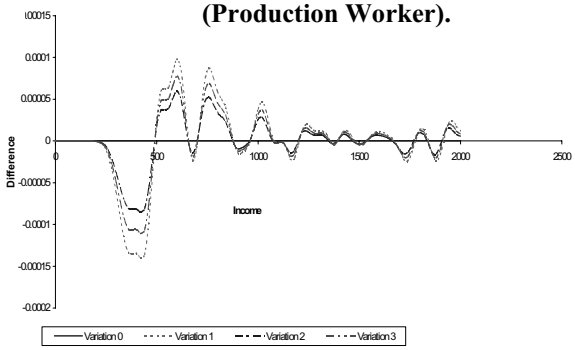
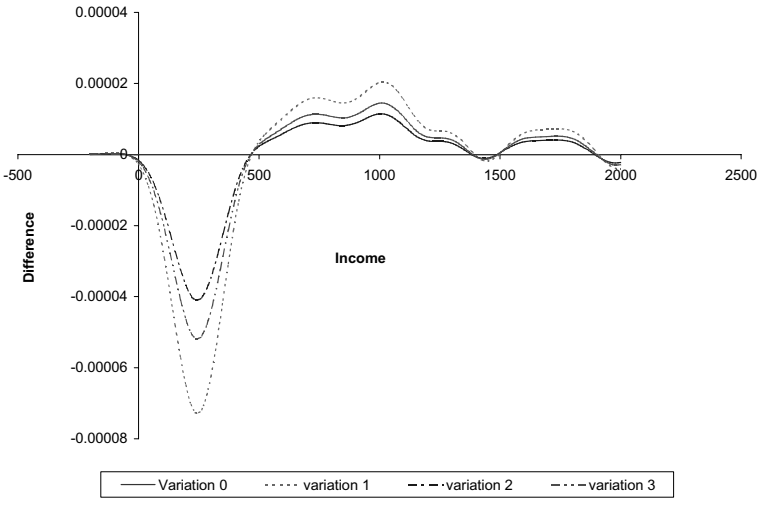


Fig. 7. Variation in Density Function (Miscellaneous).



Variation in Density Functions (Rural Households)

Fig. 8. Variation in Density Function (Professionals).

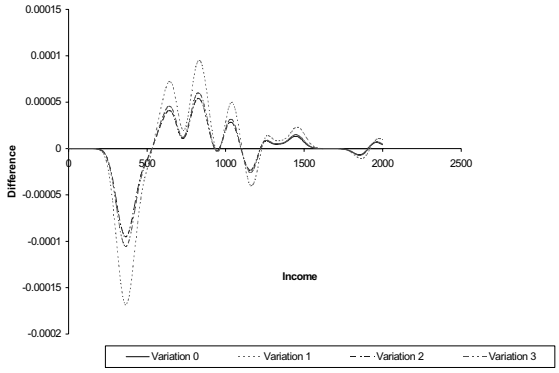


Fig. 9. Variation in Density Function (Clerks).

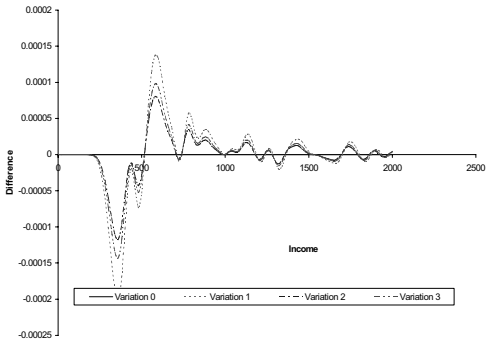


Fig. 10. Variation in Density Function (Agriculture).

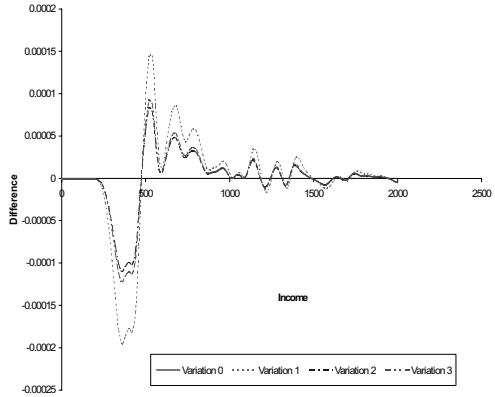


Fig. 11. Variation in Density Function (Production Worker).

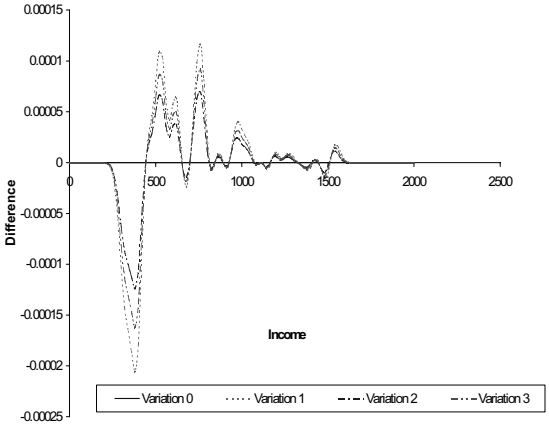
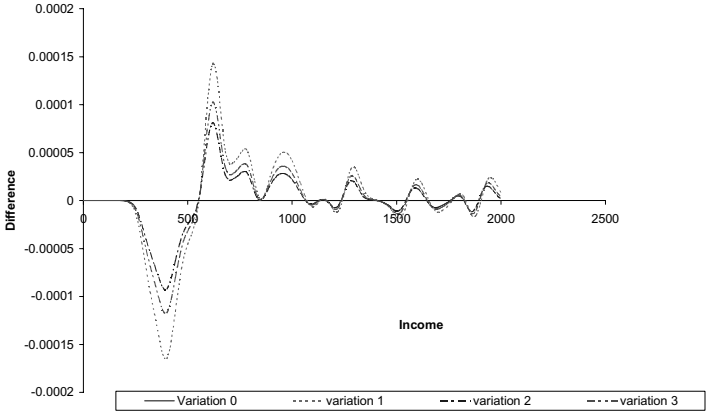


Fig. 12. Variation in Density Function (Miscallenous).



B. Impact of Foreign Capital Inflow in the Absence and Presence of Trade Liberalisation when Labour is Sectors-specific

Here we assume that labour is heterogeneous and differentiated by education level and cannot move across sectors without improving its qualification. This experiment shows how foreign capital inflows affect the returns to different types of labour in the absence and the presence of trade liberalisation. Capital is assumed to be mobile across the sectors. We focus only on the changes in the returns to factors of production, household income, and poverty level in Pakistan. Results for these simulations are presented in Tables 13 to 15.

The main findings are as follows:

(1) In the presence of trade restrictions, import competing sectors are more beneficial, i.e., 'Machinery' labour with relatively higher education is employed there. Returns to labour in this sector increases by 13.2 percent.

(2) Major exportable sector 'textiles' contracts in the presence of trade restrictions and FKI is harmful to labour relatively less skilled and the returns to labour decline by 2.1 percent in textiles. From the above two results, we may conclude that FKI in absence of trade liberalisation in crease the gap between the wages of skilled (more educated) and unskilled (less educated).

(3) The changes in factor prices are reflected in the change in households income. Table 14 shows that the income of rich households increases by a higher percentage, 2.8 percent in the urban households and 2.7 percent in the rural households.

(4) With the tariff elimination on import of machinery, wage rate of labour employed in 'Machinery' declined by 1.6 percent. In 'textile' wage rate increase but not by a significant amount, 0.1 percent.

(5) Trade liberalisation is harmful for skilled labour and beneficial for unskilled labour, and reduces the wage gap.

(6) Trade liberalisation through reduction in tariff by eighty percent on all imports, is harmful for the import competing sectors. These sectors contract and wage rate declines, in 'Machinery', 'Chemicals', 'Mining' etc. and increase in crop, non-crop, textile, and food sectors etc. Trade liberalisation reduces the wage gap in skilled and unskilled labour.

(7) Income of all households increases in the urban as well as in the rural areas. But households classified as clerks, agriculture workers and production workers, gain more compared to professionals group of households in terms of income.

(8) Consumer price index decline for all households, which result in an increase in their real income.

(9) In the presence/absence of trade restriction, an increase in foreign capital inflows benefits more rural households in terms of nominal income.

(10) In the presence of trade restrictions, poverty increases by all $P\alpha$ measures in both areas by less than one percent in the urban as well as in the rural areas. In rural areas, the head count ratio increases only for the professionals and

the agriculture workers, who receive a larger share from capital. While the poverty gap and severity indices, P1 and P2 respectively, increase for all group of households in the urban and the rural areas. This implies poverty increases with increase inflow of foreign savings when labour is sector specific.

(11) Increase in foreign capital inflow in the presence of tariff elimination on capital goods benefit more the urban households as compared to the rural households. All poverty indices decline more in the urban area.

(12) The foreign capital inflow with trade liberalisation benefits more urban households in terms of the head count ratio, but shows higher benefits to rural households if poverty measure of P1 and P2 are adopted. In the urban area, the decline in poverty is found as relatively larger decline in percentage households below the poverty line is in households, agriculture worker and professionals. In rural areas the least decline in the households below the poverty line is for professionals. Contrary to this, the poverty gap and severity index show the largest decline for professionals in the rural area.

(13) Variation in density function for urban and rural households presented in Figures 13 and 14 show the movement of individuals from the lowest income group (200-500) to the higher income group (500-1000). In the higher income groups' variation is not very significant. This implies a reduction in the income gap between the rich and the poor households in both areas, urban as well as rural.

Fig. 13. Variation in Density Function (Urban Households).

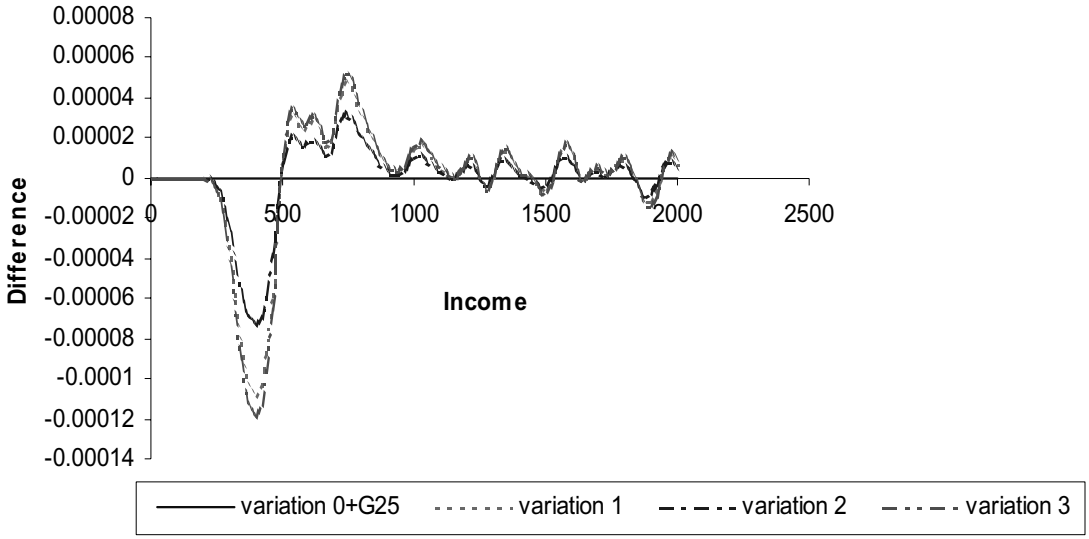
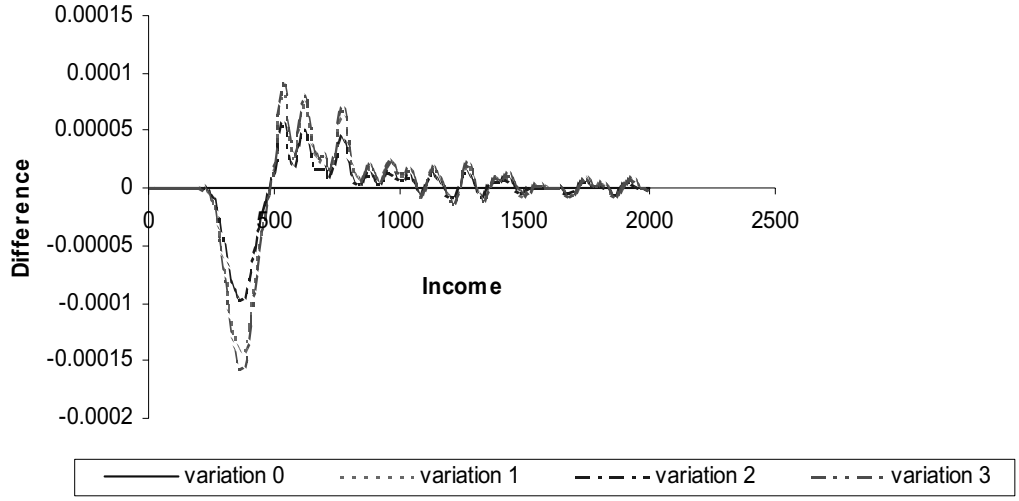


Fig. 14. Variation in Density Function (Rural Households).



VII. SUMMARY AND CONCLUSION

Since 1950s, foreign capital inflows have financed the imbalances between income and expenditure of Pakistan. On the other hand Pakistan has restrictions on imports in the form of: licensing, quota and tariffs, which has created distortions in the system leading to an inefficient use of resources. It encouraged import substitution and neglected the export sector that employs the most abundant factor of the economy 'labour'. In this paper, we have incorporated the impact of foreign capital inflow on poverty with and without trade liberalisation. The investigations into the poverty implication of foreign capital inflows have been investigated into two different scenarios: (1) labour is homogeneous (2) labour is heterogeneous.

In the first scenario, the results suggest that the foreign capital inflows benefit capital owners in the presence of trade restrictions. Real income of only agriculture and miscellaneous group in the urban area increases, while in the rural area real income of all households increase except, production workers, who are the poorest group of households. However, in aggregate, real income of the urban households decline but real income of the rural households increase. From this we may conclude that foreign capital inflow in the presence of trade restrictions benefit more rich households.

When tariff is eliminated on machinery, and foreign capital inflow increases, gain is maximum for professionals (rich) and minimum for the production workers (poor), in terms of income. However, when trade is liberalised by reducing tariff on all imports, increase in wages is larger than the increase in returns to capital. The wage earners 'professionals' in urban area gain maximum. Among the households in rural areas, professional and miscellaneous show a larger increase in income. From this we can conclude that foreign capital inflow in the presence as well as in the absence of trade liberalisation benefits more the rich households in terms of income.

In the presence of foreign capital inflow with restricted trade, all households groups benefit and poverty reduce irrespective of the measures, P0, P1 or P2, except for the production workers in both, urban and rural areas. For this group the head count ratio, P0, does not show any change, but P1 and P2 indices in urban and rural areas show an increase in poverty. All the three Pα measure of poverty decline more for rural households compared to urban households in aggregate. In the second simulation, all the three Pα measures reduce more for urban households. This exercise show that more benefits accrues to capital owners. The third simulation with the increase in foreign savings in the presence of tariff reduction on all imports shows that poverty reduces very significantly by all measures in every group of households in the rural as well as in the urban area. A comparison of the results of the first and the third simulation shows that poverty reduction in the presence of trade liberalisation is larger than the poverty reduction in the absence of trade liberalisation. The variation in density function shows that the households move from the lower to higher income brackets in all experiments. The movement is larger among the lower income groups (200-500) compared to the movement in larger income groups. This suggests that income disparity reduces after increase of foreign savings in the country. This reduction is larger among the poor groups of households.

In the second set of experiments, we assume labour is sector specific and differentiated by sector of activity. This experiment shows how foreign capital inflow affects returns to different types of labour. Wages declined increase in import competing sectors, 'Machinery' and decline in 'Textiles' where relatively less skilled labour is employed after FKI in presence of trade restrictions. Income of rich households increases by higher percentage. In the presence tariff elimination on import of machinery income of households (professionals) increases by a larger percentage in both the rural and urban areas. Trade liberalisation through a reduction in tariffs by eighty percent on all imports, is harmful for the import-competing sectors and beneficial for export sector. This leads to reduction in wage gap between the skilled and unskilled workers. However, income of all households increases in the urban as well as in the rural area. Households related to clerks, agriculture worker and production workers gain more compared to professionals group of households. From this exercise we can conclude that FKI increase wage gap in presence of trade restrictions and reduces the gap in presence of trade liberalisation.

The results show that in the presence of trade restrictions, FKI leads to an increase in poverty by all Pα measures in both areas by less than one percent in the urban as well as in the rural area. It is harmful for the poor group of households, production workers, as head count ratio increases only in this household group. In rural areas, the head count ratio increases for the professionals and the agriculture workers, who receive a larger share from capital. While, the poverty gap and severity indices, P1 and P2 respectively, increase for all groups of households in the urban and the rural areas.

In the second exercise, increase inflow of foreign capital in the presence of tariff elimination on import of capital goods benefits urban households more compared to rural households. All poverty indices decline more in the urban area. The number of households below the poverty line decline by a larger percentage in the groups of

households. In the third scenario, the inflow of foreign saving in the presence of trade liberalisation benefits urban households more in terms of head count ratio, but are of greater benefit to rural households if we measure poverty by P1 and P2. In the urban area, as relatively larger decline in percentage households below poverty line is agriculture workers and professionals. In rural areas, the least decline is in the households below the poverty line is for professionals. Contrary to this, poverty gap and severity index show the largest decline for professionals. Variation in density function for urban and rural households shows a reduction in income gap between rich and the poor households in both areas, urban as well as rural.

We can summarise the macro impacts of increased foreign capital as follows. The findings from the first simulation demonstrate that foreign capital increases the total demand for investment in the presence of trade restrictions. In absence of any other compensatory measure for the loss in government revenue due to tariff reduction, increase in foreign saving compensates for the decline in government revenue and investment demand falls. Increased foreign capital (resources) has an adverse impact on the export sector. Our results show that increased foreign capital in the country increase the inflow of imports. A comparison of a major exportable sector 'Textiles' and major import-competing sector 'Machinery' shows that with FKI in presence of trade restrictions import-competing sectors expand and sectors producing exportable surplus contract. From this we can conclude that foreign capital inflow leads to an inefficient use of resources in presence of trade restriction and benefit to export sector in presence of trade liberalisation.

From comparisons of poverty measure in different scenarios, we derive a number of interesting results.

- Poverty reduces more with foreign capital inflows in the presence of trade liberalisation.
- Free imports of machinery benefits urban households more.
- Foreign capital inflows in the presence of trade liberalisation benefit rural households more.
- In the presence of trade restrictions, the wage gap between skilled and unskilled labour increases.
- Foreign capital inflow in the presence of trade liberalisation benefits unskilled labour more and the wage gap reduces in this scenario.

ANNEX-1

Impact of Different Forms of Foreign Capital Inflow on Growth and Poverty

Study	Data	Impact on Growth	Other Variables included
Studies Based on Econometric Estimation			
(1) White (1994)	Half aid has been used to finance imports and half for debt servicing		
(2) White (1996)	Evaluating the impact of *project aid*, Study evaluates sixty-seven projects and found that they have succeeded in range of physical benefits and economic services.		
(3) Tamirisa (1998)	Capital control reduces bilateral trade for developing and transition economies.		
(4) Abrego (1999)	(1) Tariff removal leads to an outflow of capital and a loss of tax revenue. (2) Free capital mobility and their taxation reduce gain from partial trade liberalisation.		
Empirical Evidence for Pakistan			
(5) Buffie (1985)	DFI is immiserising in a small tariff-distorted economy where capital is mobile and exports are labour intensive. This result still holds when capital and land are specific factors of export and import respectively and capital is endogenously determined. In light of Buffie's argument, DFI's is expected to have welfare worsening impact with restricted imports and exports are labour intensive.		
(6) Vos (1993)	Foreign Assistance would generate 'Dutch Disease' effects and would thus be unsupportive of a structural adjustment meant to strengthen the export base and traded goods production. But loans through banks are more supportive to traded goods production.		
(7) Siddiqui (1997)	(1) Multinational companies work on profit basis and are not interested in poverty and social impact of their investment. (2) Widen wage gap which is expected to promote poverty. (3) Technology transfer cost effective way of introducing new technology but their job generating impact is limited.		
(8) Khan (1997)	(1) Little support for aid effectiveness even with sectoral disaggregation.		
(9) Wood (1995)	The paper argues that the main cause of the deteriorating situation of unskilled workers in developed countries has been expansion of trade with developing countries.		
(10) Wood (1998)	The rapid globalisation is one of the causes of increasing the gap between skilled and unskilled workers wages.		

ANNEX- 2

Computable General Equilibrium Model for Pakistan

A. Foreign Trade Statistics	
1. $X_n^s = B^T_n \left[\delta_n^T EX^{\rho_n^T} + (1-\delta_n^T) D_n^{\rho_n^T}\right]^{1/\rho_n^T}$	Export Supply
2. $Q_n = B^s_n [\delta^s_n M^{-\rho^s_n} + (1-\delta^s_n) D^{\rho^s_n}_n]^{1/\rho^s_n}$	Import Demand
3. $Q_{NT} = X_{NT}$	Domestic Demand for non-traded goods
4. $Ex_n = (P_n^E / P_n^D)^{\sigma^T_n} \left[(1-\delta_n^T)/\delta_n^T\right]^{\sigma^t_n} * D_n$	Export Transformation (CET)
5. $M_n = (P_n^D / P_n^M)^{\sigma^S_n} \left[(\delta_n/(1-\delta_n]^{\sigma^S_n} * D_n\right]$	Constant Elasticity of Substitution between imports and domestic goods
6. $\sum P_n^{WM} * M_n + (1/e)\,\overline{TR_{FR}} - \sum \overline{P}_n^{WE} * EX_n - \overline{TR_{RH}} - \overline{TR_{RG}} = \bar{e} * \overline{CAB}$	Equilibrium in Foreign Market
B. Income and Saving	
7. $Y_H = \lambda_{lH} \sum L_i^D + \lambda_K \sum R_i K_i + DIV_H + \bar{e} * \overline{TR}_{RH} + \overline{TR}_{GH}$	Households' Income
8. $DIV_H = dvr_H * Y_{FK}$	Dividends
9. $YD(H) = (1-t_{yh}) * Y_H$	Households Disposable Income
10.a. $S_H = aps_H * sav * YD_H$	Households' Saving
10b. $TS_H = \sum S_H$	Total Households' Saving
11. $Y_{FK} = (1-\sum \lambda_k)\sum (R_i K_i)$	Firms' Capital Income
12. $Y_F = Y_{FK} + \overline{TR}_{GF}$	Firms' Total Income
13. $S_F = Y_F - \overline{TR_{FR}} - \sum DIV_H - t_k * Y_{FK}$	Firms' Saving
14. $TXS_i = tx_i * P_i * X_i^S$	Taxes on Production
15. $TXM_n = tm_n * \bar{e} * P_n^{WM} M_n$	Taxes on Imports
16. $TXE_n = te_n * \bar{e} * P_n^{WM} X_n$	Taxes on Exports
17. $Y_G = \sum (ty_H * Y_H) + tk * Y_{FK} + \sum TXS_i + \bar{e} * \overline{TR}_{RG} + \sum TXM_n + \sum TXE_n$	Government Revenue
18. $S_G = Y_G - \overline{TR_{GF}} - \sum \overline{TR_{GH}} - \sum C_{Gi}$	Government Saving
C. Structure of Production	**C**
19. $X_i^S = (VA, IC_i)$	Output
20. $IC_i = io(i) * (X_i)$	Intermediate Consumption from *i*th sector
21. $IC_{ij} = a_{ij} * X_i$	Intermediate Demand of ith sector from jth
22. $VA_i = B_i[\delta_i K_i^{\sigma_i} + (1-\delta_i)(L^D_i)^{-\sigma}]^{-1/\sigma i}$	Production Function (CES)
23. $L_i^D = \left[\{\delta_i/(1-\delta_i)\}\{R_i/w\}^{1/\rho+1}\right] * K_i$	Labour Demand
24. $R_i = (P_i^{VA} * VA_i - w * L_i^D)/K_i$	Return to Capital
D. Demand	
25. $CT_H = YD_H - S_H$	Total Households Consumption
26. $C_i(h) == \{P_{ci}\ \gamma_i + \beta^c_{hi}(CT_h - \sum P_c^i \gamma_i)\}/P_c^i$	Households demand function (LES)
27. $CG_i = \beta^{\Gamma}_i CT_G / P_i^c$	Government Consumption
28. $C_i = \sum CT_{Hi} + CG_i$	Total Private and Public Consumption

29. $INTD_i = \sum a_{ij} IC_j$	Intermediate Demand
30. $I_i = \beta_i^I * IT / P_i^c$	Investment Demand
31. $Cgr_i = CT_G / P_g$	Government Total consumption in Real term
E. Prices	
32. $P_n^M = (1 + tm_n) * (1 + tx) * \bar{e} * P_n^{WM}$	Domestic Price of Imports
33. $P_n^E = (1 + te_n) * \bar{e} * P_n^{WE}$	Domestic Price of Exports
34. $P_i X_i^S = (Pt_i * D_i^s + EX_i * P_i^E)$	Producer Price
35. $P_i^{VA} * VA_i = (P_i * X_i^s) - \sum (P_i^c IC_{ji})$	Value Added Price
36. $PD_i = Pt_i * (1 + tx_i)$	Domestic Price after paying taxes
37. $P_n^C = (D_n / Q_n) * P_n^D + (M_n / Q_n) P_n^M$	Composite Price of traded goods (consumer prices)
38. $P_{nt}^C = PD_{nt}$	Composite Price of non-traded goods
39. $Pindex = \sum (\beta_i^X * P_i)$	GDP Deflator
40. $Pg = \Pi (P_i^c / \beta_I^g)^{\beta_I^g}$	Deflator for Government Consumption
F. Equilibrium	
41. $IT = TS_H + S_G + S_F + \bar{e} * \overline{CAB}$	Saving-Investment Equilibrium
42. $Q_i = C_i + INTD_i + I_i$	Commodity Market Equilibrium
43. $L_S = \sum (L_i^D)$	Labour Market Equilibrium

VARIABLES

Endogenous Variables			Exogenous Variables		
1	C_i	Total Consumption of ith Good	1	CAB	Current Account Balance
2	CG_i	Government final Consumption of Good i	2	CT_{GR}	Government final consumption in real terms
3	CT_G	Total Government Consumption	3	e	Nominal Exchange Rate
4	CH_i	Household Consumption of Good i		K_i	ith Branch Capital Stock
5	CT_H	Total Consumption of household	5	L^S	Total Labour Supply
6	D_i	Domestic Demand for domestically produced good	6	P_n^{WE}	World Price of Exports
7	DIV_H	Dividends distributed to Households from firms	7	P_n^{WM}	World Price of Imports
8	EX_n	Exports of nth good (FOB)	8	TR_{FR}	Firms transfers to the rest of world
9	IC_i	Total Intermediate Consumption of Good by ith sector	9	TR_{GF}	Government transfers to Firms
10	IC_{ij}	Intermediate Consumption of Good J by ith sector	10	TR_{GH}	Government Transfers to Households
11	$INTD_I$	Intermediate Demand of Good I	11	TR_{RG}	Foreign transfer payments to the Government
12	I_i	Consumption of Good for investment in sector ith sector	12	TR_{RH}	Foreign transfers to Households
13	IT	Total Investment			
14	L_i^D	Labour Demand in sector *i*			
15	M_n	Imports of nth good (CAF)			
16	Pg	Price deflator for government consumption			

SYMBOLS.

17	P_i	Producer Price	1	Symbols	Variable names
18	Pt_i	Domestic price without taxes	2	a_{ij}	Input Output Coefficients
19	P_i^C	Price of Composite good	3	B_i	CES scale parameter of value added
20	P_n^D	Price of domestically produced and consumed good including taxes	4	B_e^T	CES scale parameter of export transformation function
21	P_n^E	Domestic price of Exports including all taxes	5	B_c^s	CES scale parameter of Import aggregation function
22	P_n^M	Domestic Price of Imports including all taxes	6	β_{hi}^c	Percentage share of good i in hth household consumption
23	P_n^{VA}	Value Added Price	7	β_i^τ	Percentage share of good i in Public consumption
24	P_{INDEX}	Producer price Index	8	β_i^I	Percentage share of good i consumed for investment purposes
25	Q_i	Domestic Demand for Composite Good *i*	9	β_i^x	Percentage share of good i in total Production
26	R_i	Rate of Return on capital in branch *n*	10	γ_i	Subsistence expenditure by hth household

		Endogenous Variables			**Symbols**
27	sav	Adjustment in saving rate	11	λ_l	Household Share of Labour Income
28	S_G	Government Saving (Fiscal Deficit)	12	λ_k	Household Share of Capital Income
29	S_H	Saving of Household h	13	io_I	Leontief technical coefficients (Intermediate Consumption of good i
30	S_F	Firms Savings			
31	TS_H	Total Households Savings	14	mps_h	Households h marginal propensity to save
32	TXE_n	Taxes on Exports of nth sector	15	tk	Capital Income tax rate of firms
33	TXM_n	Taxes on Imports of nth sector	16	v_I	Leontief technical coefficients (value added)
34	TXS_i	Indirect taxes on ith sector production	17	σ_i	CES elasticity of substitution of value added
35	VA_i	Value Added of sector i	18	ρi	CES Substitution parameter of value added
36	W	Wage rate	19	δi	CES Distributive share of value added
37	X_i^s	Production of ith sector	20	σ_e^T	CES elasticity of transformation of export
38	Y_H	Total Income Household h	21	ρ^T_e	CES Substitution parameter of export transformation
39	YD_H	Disposable income of h Household h	22	δ^T_e	CES Distributive share of exports and domestic production
40	Y_F	Firms total income	23	σ^T_c	CES elasticity of substitution of imports
41	Y_G	Government Revenue	24	ρ^T_c	CES Substitution parameter of imports
42	Y_{FK}	Firms Capital Income	25	δ^T_c	CES Distributive share of imports and domestically produced goods

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